P/N 162051

Decade Engineering

BOB-II

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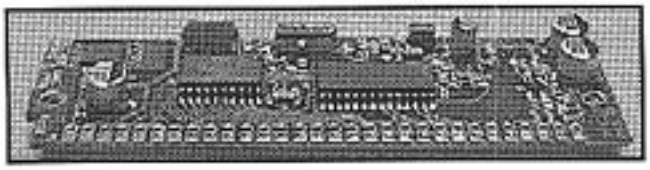

Meet Decade's second-generation low-cost video text display module. BOB-II lets your PC or microcontroller display up to 308 characters on standard NTSC or PAL (optional) video monitors. It generates video on-board, or genlocks to your external video source and superimposes characters on the image. Control is effected by simple commands and text sent to BOB-II as plain ASCII characters over a serial data link at 9600bps. BOB-II is powered by unregulated +12VDC, and offers a regulated +5V output to power associated equipment.

Applications

- Remote Video Inspection & Test
- Scientific Experiment Monitor
- Remotely Piloted Vehicles
- Teleoperated Mechanisms
- Security & Surveillance
- System Status Display
- Gaming
- R/C Models
- Industrial Process Monitor
- Home Automation
- Robotics
- Pay TV
- Electronic Signs
- Small System User Interface
- Race Cars
- Law Enforcement

BOB-II Specifications

Physical:

30-pin SIMM form factor, 3.50"(L) x 1.05"(W) x 0.35"(H), weight is less than 0.5oz. Like a memory module, BOB-II snaps into commonly available 30-pin SIMM sockets. Solder-mounting with a standard .025" square post header is optional.

Power Supply:

+12VDC nominal input (9~15V allowable). 65mA typical current. An auxiliary +5V regulated power supply output is rated at 50mA and ±5% voltage tolerance. Auxiliary supply output current adds to main supply current.

Data Path:

Asynchronous serial input only, 9600bps, 8 data bits, no parity, 1 stop bit, inverted data polarity, 5V CMOS/TTL levels. Connects directly to UART transmit out pin of microcontrollers. An inverting RS-232 interface is required for connection to a PC COM port (may be as simple as a single NPN transistor—see BOB-II FAQ). Any standard ASCII terminal program (e.g. HyperTerminal) provides control of BOB-II directly from a PC keyboard.

Video I/O:

RS-170A (NTSC) composite baseband, 1Vpp, 75 ohms, unbalanced input and output. PAL video compatibility is available as an ordering option. The video output contains a small positive DC bias, which is common to many video sources and well-tolerated at the inputs to most video equipment. Internal video background signal is automatically generated if video is not supplied to the input pin. Composite sync output (separated from input video) is provided.

Character Format:

Character patterns are 12 by 18 pixels. Up to 308 characters may be displayed, in 28 columns and 11 rows. 128 character patterns are provided in ROM, including upper and lower case letters, European language support, and useful graphics characters. Non-ASCII characters are accessible through a simple command protocol. Default characters are displayed in white with a black outline for best visibility against underlying image content.

Character Display Options:

Character Display Options: Text color is supported in local video generation mode. Eight character and background colors are available. linking may be selected for any character or group. Monochrome text (only) is available in genlock-overlay mode. External adjustment of transparency as well as character and screen intensity levels is optional. Entire text display may be toggled on and off without affecting the contents of display RAM. Writes to display RAM are permitted while the display is off.

Notes:

Product specifications are subject to change without notice. Contact Decade Engineering to confirm current status if any specification is critical to your application.

BOB-II firmware release version 1.10 is now shipping in all new BOB-II modules. This version includes a number of important bug fixes. Previous customers are encouraged to return BOB-II modules purchased prior to October 24, 1998 for a free upgrade. Returned units must fit into a SIMM socket in the factory test fixture. If connections were made by soldering to the board, please remove solder completely! Pin headers also prevent fixturing, but this upgrade is important enough that we will **replace** your BOB-II if you added a pin header and have experienced any functional defect with previous firmware versions.

More BOB-II Technical Information

BOB-II Pinout (PDF) Describes the function of every pin, but you have to connect only a few...

BOB-II Control Protocol (PDF) Or, "How Do I Talk To This Thing?"

BOB-II Character Set (PDF) All 128 available ROM character patterns.

BOB-II FAQ (PDF) Essential information for anyone developing a BOB-II application. Now includes a short snip of MS QuickBASIC code for testing or demonstrating BOB-II with a PC.

GPS Data Overlay Code Example (ZIP) Uses BOB-II with a Parallax BASIC Stamp II and a GPS receiver to superimpose time and position information on video. This application was written by an early BOB-II customer in Guam. A full project description appeared in the Summer 1998 issue of Amateur Television Quarterly magazine.

Prices and Ordering Information

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DECADE ENGINEERING

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BOB-II Pin Description

October 23, 1998

Pin	Description
1	V+12 IN, Raw power supply input. 9~15VDC unregulated source is acceptable. I_{typ}=65mA with no load on pin 3 (auxiliary power output) or pin 15.
2	Ground
3	V+5, ±5% regulated DC output. Up to 50mA available to external device (adds to pin 1 input current).
4	PD5
5	PD4/T0
6	PD3
7	PD2/INT0, "RS-232" serial input, inverted data. 5V CMOS or TTL logic levels. UART-compatible.
8	PD1, Reserved
9	PD0, Reserved
10	RES\, CPU Reset input (active low).
11	PD6
12	PB0, Analog Comparator input (+).
13	PB1, Analog Comparator input (-).
14	PB2, Reset Flag output (active low), approx. 15mS negative pulse during CPU reset. Use external 4.7K pulldown resistor.
15	PB3, Mode Indicator output. Pulls low if input video is missing. Can drive LED with series resistor.
16	PB4, Video Mute output, pulses high while video output is not available.
17	PB5/MOSI,Video Chip Select (active low).
18	PB6/MISO, Video Data
19	PB7/SCK, Video Clock
20	SYNC, Composite video sync output pin.
21	CLVL, Character intensity control input, 1.0~3.0VDC range (ground for standard application).
22	SLVL, Screen/Background intensity control input, 1.0~3.0VDC range (ground for standard application).
23	CVO2, 2Vpp unbuffered Video Out #2 (no-connect for standard application).
24	CVO1, 2Vpp unbuffered Video Out #1 (tie to EF IN for standard application).
25	Ground
26	EF IN, Emitter Follower video buffer Input.
27	Ground
28	Video Output (EF output), buffered, delivers 1Vpp into 75Ω terminated coaxial cable. Note: This output includes a small DC bias, about +1V when correctly terminated.
29	Ground
30	Video Input, 75Ω termination provided internally, 1Vpp composite video signal required. Tolerates up to +2.5VDC bias mixed with incoming video.

Notes:

Basic configuration: Supply +12VDC power to pin 1, ground pin 2. Supply asynchronous serial data to pin 7. An inverting RS-232 receive interface circuit (see BOB-II FAQ) is required for connection to a PC COM port. Tie pin 24 to pin 26. Feed video into pin 30 (optional) and take video out at pin 28 using adjacent ground pins for cable shields. Ground pins 21 and 22. Bypass pin 10 (RES\) to ground with .001uF if this line is not driven by an external device.

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BOB-II Control Protocol v1.10 ~ October 23, 1998

Serial communication parameters are: 9600bps (baud), No parity, 8 data bits, 1 stop bit.

Any transmitted character not preceded by the Command Prefix ({) will be interpreted as ASCII text and written to the screen at the current 'cursor' location. The 'cursor' position is automatically advanced to the next available character cell, wrapping to the next line as required. Untranslatable characters will be ignored. Supported ASCII characters are:

`A~Z  a~z  0~9  :  *  +  .  '  -  =  ?  /  (space)  CR`

The Carriage Return (ASCII CR) character immediately moves the 'cursor' to the leftmost position on the next available line.

Commands sent to BOB-II must be prefixed by the left curly brace character: { All commands except {T employ a fixed-length format, and do not require a command suffix. Multiple commands require a { prefix to each command in the string. Here's the command table:

Command	Description
{A	Clears the screen and sets the 'cursor' to top left home position (X=00, Y=00). This command must be followed by a pause of 5mS before sending more characters to BOB-II.[3]
{BE	Enables text display (default mode).
{BD	Disables text display without erasing display RAM. Characters may be written into display RAM while the display is disabled.
{Cxxyy	Sets 'cursor' to the indicated position. "xx" is the two-digit decimal ASCII column number (00-27) and "yy" is the row number (00-10). No internal range check.
{Dn	Character cell background color (local mode). "n" must be 0-7. Depends on {K command.
{En	Character color (local mode). "n" must be 0-7 .
{Fn	Screen color (local mode). "n" must be 0-7.
{GE	Blink enable. Following characters flash in the display.
{GD	Blink disable. Following characters display without flashing.
{HN	Internal (default) video level select. No external level controls are needed.
{HX	External video level select. See BOB-II pin description document for more information.
{In	Character outline color (local mode). "n" must be 0-7.
{JE	If {KE is used, just the written cell backgrounds are colored according to outline setting {In.
{JD	Entire character grid colored according to character background setting {Dn (local mode).
{KE	Character background enable. Following characters show cell background color.
{KD	Character background disable. Following characters display without cell background.
{MF	Local mode select. Forces BOB-II to generate the complete video signal internally.[2,4]
{MM	Genlock/Overlay auto mode select. BOB-II superimposes text on video from external source.[4]
{T...<ESC>	Byte values up to the escape character are written to display RAM without translation, making the 'special' characters available. Refer to character set documentation for a full description.

Notes:

[1] Default text appears in white with a black outline. Color features are effective only in local video mode.
[2] In local video generation mode, some character colors do not exhibit a clean appearance.
[3] {KE followed by {A paints all cells with background.
[4] Video mode switching may take up to a few seconds to complete when entering genlock mode. Data communication may be corrupted in the mode switching interval. Monitor pin 15 if automatic mode switching is possible during data transmission.